#3

PROPERTY OF
THE NATIONAL ASSOCIATION OF COST ACCOUNTANTS
NEW YORK CITY

N. A. C. A. BULLETIN

Vol. XVII, No. 9 January 1, 1936

IN TWO SECTIONS

Section I

N.A.C.A. LIBRARY

IN THIS ISSUE

Inventory Control and Valuation, by B. M. Sayre 477

Accounting for Productive Materials, by John E. Urich 483

This Bulletin is published semi-monthly by the National Association of Cost Accountants, 385 Madison Avenue, New York. Subscription price, $10.00 per year. Entered at the Post Office, New York, N. Y., as second-class matter August 28, 1923, under the Act of March 3, 1879.

EDITORIAL DEPARTMENT NOTE

During the early phases of a depression one is likely to hear much about the values of inventory control. This is the period when the losses due to lack of control are more evident and when the least can be done to prevent such losses. On the other hand, the gains to be derived from inventory control are least evident during a period of improvement and expansion. Yet this is the period when better methods of inventory control can be made to pay the biggest dividends. So, as we enter 1936 with prospects of improved business ahead, it may be helpful to consider the needs for better material control methods and the problems of adapting such methods to your particular conditions. The two articles in the current Bulletin should be helpful in this respect.

The first of these articles, dealing directly with the problem of inventory control, is by B. M. Sayre, Controller of the Thermoid Co., who had begun preparation for a medical career by registering in Tufts Medical College in 1916. His medical education was cut short by his enrollment in the army at the time of the United States entrance into the World War, and upon his discharge from the army he enrolled at Northwestern University in Business Administration, graduating with the B. A. degree. His business experience included two years as Cost Accountant with the Kroeschell Boiler Co., three years as Cost Accountant with the Brunswick Refrigeration Co., two years as Production Manager of the Emerson Watch Co., and four years as Works Accountant and Works Manager of the Carrier Corp. He has recently accepted the position of Controller with the Thermoid Co. Mr. Sayre is Director of Publications for our Newark Chapter.

Our second article, dealing more specifically with the subject of accounting for material, is by John E. Urich of Reading, Pa., Controller of the Pennsylvania State Liquor Control Board. Mr. Urich received his academic training at Albright and Ursinus Colleges and his accounting training at the Wharton School of Finance and Commerce, of the University of Pennsylvania. His accounting experience includes: six years as Cost Accountant for the Reading Manufacturing Co.; one and a half years as Special Accountant with the Parish Manufacturing Co.; one and a half years as Sales Representative of the International Business Machines Corp.; two years as Staff Accountant with the Armstrong Cork Co., assigned to the design and installation of a complete accounting system and two and a half years of public practice on his own account. During the period, Mr. Urich has been active as a teacher of accounting, having founded the Y. M. C. A. School of Accounting at York, Pa. He is a Past President of our Reading Chapter.

COPYRIGHTED BY THE

NATIONAL ASSOCIATION OF
COST ACCOUNTANTS

JANUARY 1, 1936

INVENTORY CONTROL AND VALUATION

By B. M. Sayre, Controller,
Thermoid Company, Trenton, N. J.

IT IS very difficult to understand why a manufacturing company will minutely scrutinize cash balances of $50,000, make microscopic examinations of expense reports amounting to $5 or less and make no effort at inventory control when the inventories amount to $500,000.

In many industries it will be found that material is by far the greater portion of the cost dollar, nevertheless, many employers will be found engaged in attempting to hammer down labor costs and material will go blithely on its way with the statement, "There is almost nothing we can do about it." I do not refer here to technological studies to determine cheaper material substitutes. I do not refer to market availability and research. I refer to internal control. Control which makes for minimum inventories compatible with sales requirements, reduced carrying charges with resultant larger cash balances, smaller stocks which release storage space for other facilities. All this can be accomplished if half the effort expended on labor control is diverted to a study of material and inventories.

The essential features of inventory control are:

1. To purchase raw material at the correct time and price.
2. To receive raw material as required.
3. To maintain stocks which make for maximum turnover.
4. To provide adequate information on production and cost of finished goods.

Standard Material Specifications

Let us assume that you are about to introduce a new product. As soon as the engineering department has completed its studies and a test unit has been fabricated and approved, the drawings should be converted into standard material specifications.

The specification should show the amount of material required, the type of material, whether it is to be purchased or manufactured, the size, the part number and vendor's or trade name for the

material. The information contained in the specification thus far is uniformly required by all departments involved in material handling but from this point on the several departments make different usage of the form. Therefore, the form should be prepared in blueprint, or similar form which makes for flexibility by interchangeability of additional columns. The purchasing department will require columns which will permit them to show the source of supply, the price, the time required for delivery.

The production department will require columns which will permit them to show the amount of material available, the amount required for production and consequently the amount to be ordered.

A column should also be provided for interchangeability, that is, material which is used on more than one type of production. This last item cannot be emphasized sufficiently because it is so frequently found that inventories are burdened with duplicated purchases as a result of showing identical material on two or more stock record cards because used on more than one type or size of production. The production department logically supervises the stock records because it requires knowledge of inventory status in scheduling production and this makes it the correct source of origin for purchase requisitions.

The cost department requires columns for pricing of material, labor and burden.

Sales and Production Quotas

Sales quotas and seasonal requirements should now be determined. Usually the basis of most quotas is history. In the case of a new product estimates will need to be made on the basis of all the facts available. Stock records should be provided in such form that monthly usage may be shown thereon and this monthly usage later used as the basis of purchase contracts and production planning.

From the material specifications and necessary drawings, standard times allowances should be established by rate setters under the supervision of the controller or chief accounting officer.

It is now possible for the production department to schedule fabrication by machine load and by seasonal or trade requirements. The purchasing department has established its source of supply

and time required for delivery. The receiving department has established means to keep the purchasing department on its toes for delivery. The stores department has arranged for storing facilities or for delivery to first operation point. The inspectors are prepared to report finished production to perpetual stock records. The stock records must be alive to the throb and pulsation of sales.

The Cost Accounting Department's Function in Material Control

The cost department functions in comparing standards with actuals. Dollar values of standard inventory by classes should be compared with actuals as frequently as possible but no less than once monthly. Finished production should be compared with amounts reported to the pay-roll department. The cost department is the most effective means of controlling material. It has at its command much of the mechanism which flags dangerous inventory conditions.

Standardization and Interchangeability of Parts

Inventories in the raw state manifestly are the cheapest type to carry. Therefore the engineering or methods department should devise means for rapid processing and assembly. As an illustration, I might offer the experience wherein it was found that inventories could be reduced 34% in a company where the inventory was in the two to three million bracket. This was accomplished by a radical change in design which made for considerable interchangeability of parts. Seventeen different units and 82 sizes permitted of interchangeability. This obviously reduced inventories because it wasn't necessary to carry completely assembled units. The parts permitted of rapid general assembly. Very frequently this statement is countered with one lamenting the fact that all manufacturing enterprises do not permit the same latitude. It is true, but I have yet to see the company where good control of the type I preach hasn't brought in many tangible benefits: where inventories haven't been substantially reduced, where the management could tell instantly the status of an order in the factory, where overhead hasn't been decreased by consolidation of departments and red turned in to black.

It is surprising to note the variety of bolts, screws, nuts, cotters, washers, etc., that are carried in many inventories merely because the cost department may not have directed attention to it and it is surprising too to see how a simple chart of stock sizes furnished draftsmen would bring about simplification and inventory reduction.

Engineers dream dreams, they visualize, they create. But with an innocent, utter disregard of costs. They picture a given structural steel shape and have one built when a standard much less costly shape would serve the purpose. Costs should step into the breech here and make for inventory reduction.

Economical Lot Sizes

In discussing inventory control we must consider "economical lot sizes." There are many factors to be considered but the meat of it lies in that the quantity should be such that the lowest unit cost may obtain. This necessitates that we consider material, labor and overhead cost per unit, cost of set-up, tool cost, storage requirements and obsolescence. I have deliberately avoided the use of charts and forms because each individual case must inherently be given specific consideration. Many formulas have been developed for determination of lot sizes but they are all so complicated that they are impractical in everyday use.

Inventory control is an integral part of routing and scheduling. There is no steadfast rule which may be adopted for the minimum parts to be manufactured. This is a factor which must be established after ample study of historical events in the nature of sales accomplished. There are parts which may be ordered by virtue of their constant usage and in lots anticipating a continued demand. This order point should be regulated as market conditions change and, after all, should be dictated by the sales division. We should normally anticipate three months' supply. The amount of stock is determined by the running balance that is maintained on the inventory cards. There are, of course, exceptions to the three months' ordering supply. For example, purchased parts may be ordered in quantities which would take into consideration the best available discounts. Frequently we may order parts into production which may be a half year or a full year's supply. This is best exemplified by screw machine products which require a long and

difficult set-up. If the parts are bulky and require a long machining operation, it may be desirable to order the parts in very small lots. The most intricate, and yet the most important requirement of inventory control is tied up with the scheduling to assure all parts arriving at the assembly floor at a predetermined time. If the material is ordered only for definite production schedules, then and only then can changes be made with minimum obsolescence of unused parts or materials. By having the sales division responsible for a definite production schedule and balancing the inventory to meet the schedules, the sales division will not be overly anxious to make changes which will involve obsolescence, especially when it is responsible for the materials that have been ordered for its account.

Planning and Scheduling

We have not mentioned paper work so far in this paper, but paper work is, of course, essential in any organization, and we omit any specific plan for shop control and paper work, and choose rather to discuss, in a general way, what need be accomplished to this end. First and foremost we must determine a process of scheduling our production. Again no universal plan is available. A careful study of the present and future needs of the particular plant involved, with common horse sense applied, is what is necessary. A clear-cut procedure should be established which permits inventory control, not necessarily in values, but most assuredly in quantities. Order points for manufacture must be established, and the inventory control should guide the planning department in the quantities it is to fabricate and when they are to be fabricated. This work may be done in what we shall call a central planning division, which may serve one or more plants. In each respective shop there should be established a scheduling division which would have under its control standardized time as determined by competent time study engineers, standard drawings, standard material specifications, standard operation charts for each individual operation, and standard tool and equipment lists. By means of this equipment and a visible planning board, which would have scheduled thereon each machine tool and station of operations, we can readily understand the ease with which scheduling may be done or changes accomplished.

Steps in Planning Inventory Control

In planning, then, for inventory control and methods, an organization should:

1. Organize channels for flow of ideas and statistics influencing change to a reservoir.
2. Define standard practice for consideration of this data.
3. Define requirements and use standard procedure in considering changes.
4. Place approval of new products jointly with several departments interested before production.
5. Plan for mobility of plant, men, machines, materials, routine and processes.
6. Plan production for definite quantities and a production program jointly approved by sales, production, research and design departments.
7. Plan flexible inventory control and simple routine to meet requirements of individual plant.

Proper Points for Checking Consumption and Yield Important

Another very important factor in inventory control is the stages at which process inventories should be evaluated. For illustration it is extremely important that rubber products be checked frequently for yield when standards are used for charging and relieving inventories. It is ordinarily necessary in this industry to maintain separate accounts for the compounds, calendering, cutting and perhaps one or two other process centers before arriving at finished goods. Shrinkage and wastage is an inherent and important factor with the result that inventories will be grossly distorted if control isn't provided at several points along the process line.

Process inventories provide most problems in control. A very effective means has been to keep the material, labor and burden in separate process accounts and to periodically and frequently check ratios. It will be found that a very marked relativity of one element to another exists if the process account has been handled correctly. This is most important when a standard process cost system is in operation for therein lies the danger of paying labor

for more than it produces and for incorrectly charging the process account with earned burden.

Inventories should be evaluated at actual costs and compared with standards to provide cost ratios as the basis for determining estimates and selling prices. The cost ratio of material and labor by classes of product is the best index of market trend and operating efficiency.

A Duty and Opportunity for Cost Accountants

As cost accountants it is our duty to help shape managerial policies which make for cost reduction. Mere recording of facts is inadequate. We cost accountants are in a strategic vantage point. We can stand off and impartially weigh the merit of existing policies and follow through with recommendations affecting any and all operating departments.

If you carry away just one small idea from the several I've presented and you study it, convert it to meet your respective and peculiar wants, I am sure it will go a long way towards establishing cost reduction and enhance your individual worth to your employer.

ACCOUNTING FOR PRODUCTIVE MATERIALS

By John E. Urich, Reading, Pa.
Controller, Pennsylvania State Liquor Control Board.

ALL accounting has to do with the accounting for values and material is merely one of these values. The term material as here considered applies only to those materials which become a part of a manufactured product, productive materials as distinguished from materials purchased or used for expense purposes. In other words, we are considering productive materials and not productive supplies nor non-productive supplies, the latter two being properly treated under expense.

Before considering the subject of material, let us consider the relative importance of all the values employed in business. All statements, exhibits, reports, etc., constitute an accounting for either the status or the functioning of the various values employed

in connection with a particular business. These values are affected either through exchange and utilization or by the very fact that they are employed within a particular sphere of business enterprise. All schemes, methods, accounting systems and devices are mere steps toward effecting the preparation of these statements.

Financial Statements Report on Values Employed and Value Changes

The balance sheet constitutes in reality an accounting for the values employed in a business. The debit side of this statement shows the values in which the capital employed is invested. The credit side of the statement shows the sources of the capital employed, showing particularly that portion furnished by the owner or owners—capital and surplus, and that portion which is furnished by other than owners, the creditors represented by accounts payable, accruals and other short and long term obligations.

The profit and loss statement exhibits the result of the exchange of values shown on the balance sheet and the effect of these exchanges on the equity of the owner or owners. It is merely a current statement showing changes of these equities during a given period.

The job of the accountant carries a responsibility to owners and creditors and is basically concerned with accounting for the status of and the changes in values in which the capital is employed. The equities of owners and creditors are no more valuable than the values in which the capital is invested and all accounting should be set up to show not only the value of the various types of assets in which the capital is invested but should also show whether these assets are as effectively employed as possible.

Too much stress cannot be placed on the importance of sufficient details to show the owners, the creditors, and those responsible for the investment, the character and the nature of the assets in which the capital is employed so that it may be determined whether or not the capital is properly employed and whether the amount of capital is economically correct. In addition, the accounting should show all necessary factors which tend toward any increase or decrease in each of the assets employed. To reflect all this, accounts must be established to show the status of each of

these assets as at a given time and show descriptively the changes in their value during a given accounting period.

When Is Detailed Accounting Desirable?

There exists a very wide difference between the importance of accounting attached to the various values in business. When cash is involved no amount of expense is spared. No scheme or system is too detailed in accounting for cash, days are consumed in running down differences, and to close the books without a complete reconciliation of bank balances is a breach of accounting ethics which cannot be forgiven. The moment, however, this same cash is invested in materials or other assets, except perhaps accounts receivable, it seems to lose some or all of its importance. Any efforts made to properly account for material values is just so much red tape. Much of the so-called "red tape" represents in many instances a complaint hurled against details by those who merely detest them. It is better to have a little too much detail than not enough.

In accounting for materials, accounts should be built around materials and should enable the determination of their status at any time from the time they enter raw materials through work in process, finished goods, and into cost of sales.

What Constitutes Adequate Material Accounting?

Material must retain its identity as a separate component of cost throughout an entire process of production and period of ownership. The accounting established in connection therewith must endure the measurement of the efficiency of the character and quality of the material itself as well as the purchasing, care, application, and utilization of it. The information gathered in connection with these factors provides a basis for cost analysis which not only discloses elements of cost but also enables comparison with standards for assistance to management in control of operations.

Management is charged with the responsibility of the custody of raw materials, the care and utilization of these raw materials in the most efficient manner so that a profit may be produced and insure continued business activity not only to individual enterprises but to all business.

Much can happen from the time raw materials enter a plant to the time they pass out in the form of finished product and the accounting should provide for the reflection of any and all changes in the value of these materials as well as the utilization of these materials in production.

Management asks what constitutes the measure of economical care and utilization. The answer is "standards" determined by study and established by experience, and which will, if attained, produce proper results. In order to show results, the system for accounting for material must be a distinct part of the accounting system. This will not only provide for disclosing the cost of every factor concerning the quality, care and utilization of material but will render the system flexible so that the procedure as concerns material can be changed without interfering with any other part of the system.

The most effective system of accounting for material follows the physical steps employed in the handling of them. Before the installation of the system a study of the methods employed and flow of material should be made, the most efficient methods installed and established, and the accounting for material designed to follow the physical methods.

Terms Defined

Based on the foregoing premises, the writer will endeavor to discuss the practical application of accounting to materials. Before proceeding let us consider the following definitions as applied to this paper:

Productive materials are those materials which are purchased for and become a part of product manufactured. Manufacturing processes merely change the form of this class of material; the measure of this change is recorded by the amount of labor—productive labor—required. This, of course, would apply to physical changes only but for practical purposes may be applied to chemical changes as well.

Productive supplies are those supplies or materials which are purchased for use in the manufacturing processes and can be measured by production, but never become a part of the product manufactured.

Non-Productive Supplies are those materials which are purchased for and used for expense purposes.

The Use of Material Standards

The application involves the use of materials standards. It is the opinion of the writer that all accounting for materials should be based on predetermined values, to provide for uniform charging to the processes as well as for the purpose of forecasting. These predetermined values, call them standard, can be used for determining purchasing efficiency and in the calculation of predetermined unit costs. They provide a definite, constant and uniform charge against our product and eventually against cost of sales, thereby enabling ready comparison with other periods. There are so many variation factors which affect materials from the moment they are received that a uniform known value means just one more of these factors eliminated.

It is not the purpose of this paper to discuss the development of material standards, but in order to clarify the discussion the writer presents definitions of the various standards as follows:

1. Material usage standards—the quantity of raw materials required to produce a definite unit of product.
2. Material price standards—the standard unit price at which materials are to be purchased and applied to cost.

The development of these two types of standards does not fall within the province of this paper. Any accepted method which contemplates quantity and quality of raw material employed in the efficient operation to produce a unit of product, on an economical basis, should produce proper standard.

Purchases of Materials

Purchases are made in accordance with production requirements and engineering specifications. Engineering specifications may take the form of "Bills of Materials" covering types, models, or shop orders. These specifications showing standard quantities description and standard purchase prices of the various materials required to produce each unit of production or shop orders, together with quantities of units, form the basis for the preparation of purchasing schedules. The purchasing schedules should show total

quantities and standard cost of each kind of material which must be purchased and the total standard cost of all purchases.

After these schedules have been prepared, a purchase requisition, requisitioning the purchasing department to purchase the required materials should be issued by the production department.

Immediately upon the receipt of the purchase requisition, the purchasing department should proceed to purchase the materials required.

The purchasing department responsibilities should begin with the receipt of the purchase requisition and end with the delivery of the material. In order to properly function in this respect the department should—

Know—
- Sources of supply
- Markets
- Prices
- Time required for deliveries.

Maintain records on—
- Sources of supply
- Markets
- Prices
- Availability of materials
- Orders placed
- Materials on order
  - By vendors
  - By materials
- Materials in transit
- Expected deliveries.

Copies of all purchase orders, showing description and quantities and prices of materials are sent to the accounting department.

Assuming that a purchase order has been issued, the vendor has shipped the materials and forwarded his invoice, and that the invoice has been received, the invoice is checked against the purchase order for price and quantity of material. If the invoice is found to be in order, it is recorded on a "Materials in Transit Summary," and the invoices filed into a "Materials in Transit" file. Totals of this summary form the basis for a monthly debit to an account

known as "Materials in Transit" and a credit to an account known as "Obligations to Vendors on Account of Materials in Transit."

The Receiving Report

The receiving of materials brings into use the first important record in accounting for material. Needless to say this is a most important record. It is the first point of accounting for the physical material. The record should carry all information necessary to the identification of the physical material with the materials and provision for recording the quantities and values involved:

Actual Cost
Material
Freight

Standard Cost
Material
Freight

The importance of original records (not original books of entry) cannot be stressed too much. They carry the original record of a transaction, upon which is based all future accounting. Our accounting is not any more accurate than the original record. After this original record, the collection and summarization of the information is a matter of routine. Too often the recording of this information and the preparation of these records is left to individuals who do not realize their importance. The preparation of the receiving report requires a knowledge of the final results which are obtained from them. The place for the able clerk is at the source of the information; at the point at which values are assigned and identity so far as your individual plant is concerned.

The receiving report may be prepared in as many copies as the departmentization of the enterprise requires, but should at least consist of three copies, one copy retained by the storeroom receiving the materials, and two forwarded to the cost department. One of the copies of the receiving report is used as the basis for checking the invoice for quantities and is attached to the vendor's invoice. The second copy received by the cost department is used as a basic accounting record and provides space for recording both standard

and actual costs. This record immediately provides a basis for comparison of actual with standard costs of materials purchased and serves

1. As a basis for posting to "Receiving Report and Purchase Variance Record."
2. As a basis for posting to "Perpetual Stock Record" for quantity only.

The material receipts and purchase variance consists of a record kept with each item of material recorded, showing quantity and unit and total cost at actual and standard cost. The record is the basis for the preparation of the monthly receiving report and purchase variance summary.

Invoices covering materials received are passed for payment, vouchered, and summarized on the voucher register and the total credited to "Audited Vouchers Payable" and debited to "Obligations to Vendors."

The Receiving Report and the Purchase Variance Summary

The receiving report summary should show a list of all items received, showing quantity, actual cost, standard cost and variance on each item and in total. The variance thus shown serves as a basis for determining purchasing efficiency. The report at the same time provides totals used for accounting purposes.

The total actual cost is credited to "Materials in Transit" and debited to an account known as "Purchasing Profit and Loss Account" and the total standard cost is credited to purchasing profit and loss at standard cost and charged to inventory raw materials at standard cost.

The debit side of the purchasing profit and loss account thus shows the actual cost of all purchases while the credit side shows the standard cost of these purchases. The account enables the determination of the ratio of actual to standard costs of raw materials purchased. The balance in this is ordinarily a profit and loss item; this, of course, has a tendency to distort the operating profit for a given month in cases where purchases are beyond production requirements. When this condition exists, proper adjustment can be made.

If the closing inventory of a given period is much higher than the opening inventory, although in a well managed business this should not occur, a portion of the variance should be capitalized for statement purposes.

Thus raw materials have been accounted for up to the point where they are in raw materials stores. The procedure shows immediately what losses we may anticipate. If the purchasing profit and loss account shows a loss, either the purchasing department is not functioning correctly or it is time to revise our standards and consequently our selling prices to provide for this increase in cost. Moreover, it is time to look into trends which should have been anticipated in our standard or have perhaps not been correctly anticipated.

But we carry out inventory of raw materials at standard cost—is this proper for balance sheet purposes? There should not be a very wide variance between the standard and the actual if we heed the information of the purchasing profit and loss account which can be made the barometer of the trend of raw material costs. However, there is no harm in carrying raw materials inventory at standard cost if we provide for reflecting the replacement or market value, which may be accomplished through the receiving report and purchasing variance record.

A statement of the values in a business, i.e., a balance sheet, is correct only as at the time it is prepared. Our accounts, therefore, should show primarily basic values and provide those factors which will enable us to qualify these to show the proper valuation of all items on the financial statements.

From this point our accounting for materials should not only cover cost but those other elements which affect the value of materials. The moment raw materials enter stores the element of uncertainty enters and any measures which are taken to eliminate these uncertainties is a move in the proper direction.

The Material Stock Record

Perpetual stock records should be maintained to record quantities as a guide for control for production purposes. Quantities as shown on the perpetual stock records should agree with the physical count of the various items on hand. The fact, however,

that they do not agree is no reason for condemning the effectiveness of the record.

From an accounting point of view, a perpetual stock record is effective if it shows correctly what has been applied to production, that is, what has been accounted for in production. If the quantity balances do not agree with the physical count it shows that a loss has occurred for which we have not accounted.

Accounting for shrinkages and overages in raw materials stores is a continuous operation. It involves the continuous check of physical quantities with the balances as shown by the stock records. For this reason period checks should be continuously made and all overages and shortages reported and accounted for.

The perpetual stock record is just another tool toward accounting for the hazards which encounter material values in business. The responsibility of the stock clerk, "not stock man," does not end with the accounting for all withdrawals and receipts but for all shrinkages and overages as well. Monthly report of overages and shortages should be reported and charged to a "Raw Materials Shortage and Overage" account. The balance in this account reflects the efficiency of storeskeeping.

Items of a perishable nature or where the element of time affects value, should be appraised for utilization value and shrinkages immediately reported and accounted for by record to proper account. Effective cycle checks should be established where groups are checked at regular intervals for the detection of shrinkage or deterioration. Where it is not practical to immediately reflect any shrinkage, provision must be made to account for such shrinkage when materials are applied to work in process. The question is not so much one of when as one of the certainty of it being done.

The set-up should provide for accounting for basic values and such other information as is necessary to properly reflect the value of raw materials for balance sheet purposes. There is a difference between utilization and financial values in manufacturing and good accounting will attempt to show both.

This discussion is predicated on the use of standard costs for material values. Without standard costs it is impossible to control values of material, particularly in process. It provides a uniform and constant value, from the time materials enter the raw material stores until they become a part of cost of sales.

An Alternative Method

Raw material values may be carried at actual cost. If this is decided upon the purchase variance is developed at the time materials are withdrawn from raw stock and both actual and standard values developed on material requisitions and accounted for as follows:

Raw materials credited and purchase profit and loss debited at actual cost. Purchase profit and loss credited and materials in process debited at standard cost.

Actual costs may be applied under either the oldest stock (first in, first out), average cost or highest cost methods, preferably average cost. In no case should materials be charged into work in process at anything but uniform and standard value.

The receiving report under this plan will function in the same way as in the case where materials are carried at standard, but will be credited to raw materials in transit and charged to raw materials inventory instead of the purchasing profit and loss account.

The receiving report and purchase variance summary, and purchase variance record are replaced by a receiving report summary at actual cost and a materials applied to production summary. This summary is prepared from material requisitions and will show all items applied to production at actual and standard cost and the variation on each item, and is the basis for debit and credit to purchasing profit and loss account.

Materials in Process

The accounting for materials up to the point where they enter the raw materials stores should be uniform for all business. From this point, however, the product manufactured and the type of cost system used will have a slight bearing. Taking the two broad and main classes, process and order cost systems, the methods should vary only in applying to units produced.

Under the process cost plan, materials are applied to the units of product manufactured. Under an order cost system materials are applied to orders.

For the purpose, therefore, of this discussion we will make no distinction and consider a unit of product and an order as a unit of production.

In accounting for materials in process, the first record is the material requisition. As in the case of the receiving report, it is a basic record and summarizations based on it are no more accurate than the information carried by it.

It constitutes an invoice of materials to production. Materials are withdrawn at standard cost and charged against work in process after which they retain the same standard unit value. The accounting for materials in process resolves itself into one of accounting for utilization and shrinkage in quantities. Accordingly, materials withdrawn from stores should be charged to a material utilization account.

Materials do not become a part of materials in process until the first operation has been performed, that is, the operation which identifies the material with a unit of product or a shop order. This point of usage, therefore, is the second point in accounting for materials in process. Here the product takes shape and identity and is known as a piece, pound, or such other unit of measure as applies. Here the first loss may be incurred. Losses, after the first operation, are losses of pieces of product and the cost of the materials as applied to a unit of production does not change. Any increase in cost of the product consists merely of an addition of labor and burden cost.

Material Utilization Account

The utilization efficiency of materials is expressed in the materials utilization account. This account is charged with the total actual usage at standard cost and is credited with the total standard usage at standard cost at point of first operation or the point where the product assumes identity as a unit of product and the standard value of offal, by-product and waste. The differences between the debits and credits to this account represent the measurement of utilization efficiency and should be considered a manufacturing expense.

The materials utilization account may be set up so as to show a detailed analysis. This may be done by setting up various classifications descriptive of causes for excessive shrinkage due to usage. Under the suggested procedure it must be noted that after the material has been shaped or fabricated into a unit of product, there

can be no further shrinkage as material. Any loss occurring after this stage is considered as manufactured scrap. Manufactured scrap may be any defective unit of product either in the finished stage or at any stage of process. It must not be confused with offal, by-product or waste, which are terms used to describe the excess of material required to produce a unit of product.

As is the case with the purchasing profit and loss account, the material utilization account is the barometer for measuring the efficiency of operations from the standpoint of utilization of materials as compared with a standard. Any wide variance will be reason for analysis and study. If the standards have been properly established, a debit balance will show the lack of efficiency. On the other hand, a persistent debit balance may indicate an error in our standards.

In Process Production Summary

The course of the credit to the material utilization account is the in process production summary. The in process production summary is a schedule of all units produced, priced at standard material unit cost, extended and summarized to show the total standard material cost. The statement also shows the standard value of by-product, offal, or waste, produced in detail and in total. The total of these two constitutes the credit to this account.

The matter of the method of handling is secondary. The thought to be borne in mind is that to properly account for material utilization must be measured and that the method used should provide the means for analysis so that it may be ascertained whether any excessive differences are attributable to usage, defective raw materials, defective equipment, etc. The statement used to show these factors is known as the material utilization summary.

Material Utilization Summary

This summary is used for the purpose of explaining variances shown by the material utilization account. It attempts to allocate to causes, products and responsibility these variances. The statement constitutes a most valuable document in the control of losses due to excessive use of materials, carelessness in handling of materials or defective or inferior materials.

Finished Production Summary

Finished production should be summarized on the finished production summary. This summary shows the number of units of finished product which passed into finished stock, priced at standard material unit cost, extended and summarized to show total. It is the basis for credit to work in process and debit to finished goods.

Cost of Sales Summary

The cost of sales summary should show the number of units of product sold. These units priced at standard material unit costs, extended and summarized form the basis for credit to finished stock and debit to cost of sales.

In this connection, the writer wishes to state that he is an advocate of carrying inventories of work in process and finished goods according to the three components of cost. Accordingly, under the plan discussed a separate classification would be set up for the material value in work in process, finished goods and cost of sales.

This paper is an attempt to present a line of thought in connection with the accounting for materials without entering into details as to methods. If I have succeeded in conveying my thoughts in this matter, I feel that my purpose has been accomplished.

BIBLIOGRAPHY

INVENTORY CONTROL

N. A. C. A. Publications:

Accounting Features of Inventory Control in a Truck Factory. C. R. C. Custer. Bulletin I, May 15, 1933.

Accounting for Material Use and Control. W. A. Block. Bulletin I, October 15, 1933.

Control of Stocks and Merchandise. Herbert C. Freeman. Bulletin I, August 15, 1925.

Head Office Inventory Control. Fred W. Krage. Bulletin I, May 15, 1935.

Inventory and Material Control in the Columbus Dental Mfg. Company. Warren A. Stevens. Bulletin I, June 1, 1932.

Inventory & Production Control of the Corset Industry. George W. Rood. Bulletin I, May 15, 1935.

Inventory Control as Used by Taylor Instrument Companies of Rochester, N. Y. John F. Clark and H. J. Noble. Bulletin I, September 15, 1931.

Punched Card System of Inventory Control, A. W. V. Davidson. Bulletin I, August 15, 1923.

Value of a Material Control System. George Nairn. Bulletin I, July 15, 1934.

Method of Sales Analysis, A. H. T. Hildebrandt. Bulletin I, May 15, 1935.

General:

Card Records Simplify Stock Control. Warren Foundry & Pipe Co. R. H. Butz. *System and Business Management,* 330 West 42nd St., New York, N. Y. January, 1935.

How Often Shall We Order? W. E. Curley. *System and Business Management.* February, 1935.

What Size Lots Shall We Order? W. E. Curley. *System and Business Management.* March, 1935.

Inventory Control. H. P. Dutton. *Factory Management & Maintenance,* 330 West 42nd St., New York, N. Y. August, 1935.